

# Proceeding with Caution: First global guidelines proposed for ancient DNA research

October 20 2021, by Stephanie Dutchen

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A scientist extracts DNA from ancient human remains and prepares it for analysis. Dozens of scholars have proposed a set of ethical guidelines that could be used worldwide for conducting genetic research on ancient individuals. Credit: Kayana Szymczak

As ancient DNA research sweeps the globe, ballooning from zero genomes sequenced as of 2009 to more than 6,000 as of 2021, those involved in and affected by the genetic analysis of human remains have

pressed with ever greater urgency for ethical standards that can be applied wherever such research is carried out.

Researchers studying the DNA of humans who lived hundreds, thousands, or even tens of thousands of years ago have tried to determine the best ways to conduct their work so that it consistently respects the remains as well as those who have a stake in the research.

Such stakeholders can include people and groups who feel connected to the ancient individuals, those who consider themselves stewards or guardians of the remains, and scholars in fields such as archaeology and anthropology.

Taking a step forward in articulating a set of globally applicable guidelines, dozens of archaeologists, anthropologists, museum curators, and geneticists from every continent barring Antarctica convened online in November 2020 for a meeting on ethical issues in ancient DNA research.

Researchers from the Blavatnik Institute at Harvard Medical School helped organize the meeting and subsequent discussions, supported in part by a grant intended to spur interdisciplinary collaboration and tackle challenges in the field of ancient DNA.

The results—authored by 64 scholars representing more than 30 countries and diverse ethnic and cultural backgrounds—were published online Oct. 20 in *Nature*.

Harvard Medicine News spoke to two of the paper's co-corresponding authors about the endeavor: Jakob Sedig, HMS research fellow in genetics and an ethics and outreach officer in the lab of genetics professor David Reich, and Kendra Sirak, HMS research associate and a senior staff scientist in the Reich lab.

## **HMNews: What is the main goal of having a set of international guidelines?**

Kendra Sirak: While some countries have developed rigorous standards that guide the scientific analysis of human remains, many others have few or no guidelines that ensure that this work is carried out responsibly and is both scientifically robust and sensitive to community perspectives. Everyone wants practical guidance that will be positive about the research enterprise while embracing high ethical standards.

It's our hope that these guidelines will raise the integrity of ancient DNA research around the world by minimizing damage to collections of human remains; ensuring sensitivity to the perspectives of stakeholder groups, especially when these groups are marginalized; and reducing opportunities for the misuse of results. We expect these guidelines will undergo further development as the field continues to evolve.

## **HMNews: Why now?**

Jakob Sedig: Ancient DNA as a field has been growing rapidly, evolving from a promising technology to a mature field. The discussion about how to handle human remains and how to meaningfully involve diverse stakeholders has not yet caught up. More and more people are calling for clear, strong guidance that all researchers engaged in ancient DNA work can embrace.

Ancient DNA analysis has contributed vital new insights about the human past and has helped us understand the genetic roots of human diversity. It has disrupted nationalist and xenophobic narratives. It has challenged what many of us thought we knew about who we are and where we came from. But like any field that matters, it's complex.

Because of the number of ancient individuals being analyzed, the social and political nature of the work, and the challenges that ancient DNA findings have raised about theories proposed before we had such data, people are paying attention to ancient DNA. That makes it even more vital to articulate and adopt strong guidelines that work well everywhere.

## **HMNews: How did the team come up with these five guidelines?**

Sedig: We took cues from archaeology and modern human genetics, which have established protocols for carrying out analyses on human remains and establishing stakeholder consent. We built on aspects of existing guidelines, such as those crafted by a group of North American scholars, including Indigenous scholars, published last year in the *American Journal of Human Genetics*.

Our diverse co-author group—particularly those in Central and South America, Africa, Europe, South Asia, the Pacific, and East Asia—felt that these and other suggestions, while valuable, were not applicable in all world regions. Our virtual workshop led to monthslong discussions that took many different value systems and histories into account and sought balance between local contexts and general principles. We then wrote the manuscript.

Given that there was near-unanimous support and excitement about the final document among the workshop participants, we hope the broader community will embrace and build on these proposals. It would be wonderful if the proposals form a basis for official guidelines in the future.

## **HMNews: Why not just follow national or local government regulations wherever a project is being**

## conducted?

Sirak: There are some places where laws are robust enough for that to be appropriate, but in other locales, we feel that researchers need to hold themselves to a higher standard than required by the laws currently in place.

## **HMNews: What are some of the needs and unique circumstances in different regions that shaped the guidelines?**

Sirak: We have found that guidelines that work well for one region can come across as condescending or even colonialist in another. Many co-authors on this manuscript raised the point that indigeneity has different meanings in different places and is even used in some regions as a framework for oppression and discrimination against minority groups argued to be non-Indigenous. Thus, basing research ethics on a single definition can inadvertently reinforce rather than mitigate power imbalances in conducting and interpreting genetic analyses.

## **HMNews: Some critics say that ancient DNA research, which to a large extent has focused on and been conducted by white people from wealthy nations, has been a colonialist endeavor that siphons agency from marginalized groups. How do the proposed guidelines address these discussions about power and ownership?**

Sedig: These are important conversations. We can't reiterate enough that our goal is to learn about the past in a sensitive, thoughtful, and ethical

way. We do not want to contribute to exploitation; we want to do the opposite. We need to listen to and respect the people who are stakeholders in ancient DNA studies—including groups from the place of origin of the human remains being studied—and make sure their perspectives are represented in discussions about study design, research questions, and whether a project should proceed at all. There's been a huge amount of progress in recent years in seeking local perspectives from the start to the conclusion of a study and incorporating that feedback into the project and publication. We have increasingly diverse groups of people who conduct the research as well.

We want to minimize harm and reduce inequity, and I believe the ancient DNA community has an extraordinary track record of providing arguments that do so. We know that in regions with histories of settler colonialism, we have to center Indigenous perspectives. We have to confront the colonial legacies of human remains collected in unethical ways and often sent abroad, and we should seek ways to mend the harms done, such as by considering how our research findings or the methods we are using might be helpful tools for facilitating repatriation of remains. We must ensure that local scientists and communities are as engaged as can be in ancient DNA research, particularly in places with histories of scientists conducting exploitative research. Researchers working in countries outside their own must prioritize establishing equitable collaborations that benefit local scholars and avoid carrying out "parachute research" at all costs.

When possible, those of us in positions of privilege should contribute to reducing structural inequities. Some ideas we propose in the guidelines are to help educate and train local community members and other stakeholders, assist with raising the curatorial standards of collections or developing museum exhibits, provide funds for training or attending professional meetings, and advocate for funding agencies to build more capacity for equitable ancient DNA research. We also need to ensure

that we communicate results in ways that are accessible to nonscientists and the broader scholarly community. Lastly, we have to oppose those who use [genetic data](#) to support narratives of group superiority or to justify exclusionary policies.

At the same time, as scientists we need to make sure we can proceed in a way consistent with the scientific method. We can't ethically conduct a study without the guarantee that we can follow the data where they lead. This means that once stakeholder communities agree that publishing results would not cause them harm, the relevant portion of a manuscript won't be restricted. It also means the data must be made accessible at least so others can replicate or reevaluate results.

We have a loyalty to the facts we uncover as we learn about our shared humanity. In cases where the data we generate don't align with other forms of knowledge, such as traditional expertise or cultural beliefs, it is not our job to discredit or diminish that knowledge. Rather, those discrepancies highlight how complex an undertaking it is to understand the past and should be flagged in papers that result from the work.

Regarding "ownership," we believe that whenever researchers are granted permission to study the remains of ancient individuals, they become stewards of that material with a responsibility to care for and respect it. They do not assume ownership of the remains—or of the data that arise from sequencing it.

**HMNews: Some groups assert that stakeholder communities should decide whether and how certain kinds of ancient DNA data can be used in future analyses. How does this fit with the team's push for open data?**

Sirak: We advocate for stakeholders having input into how data should be distributed and we advocate for open data. We believe that both goals can coexist.

Many of our co-authors felt strongly that ancient DNA data should always be made fully and publicly available. Other co-authors argued that when it comes to data from remains that might be meaningfully connected to present-day Indigenous communities, it could be appropriate to have usage restrictions. This was one of many debates we had, and in listening to one another, some of us changed our positions.

In the end, we all agreed that open data for ancient DNA is something to strive for. The data must be made available after publication—either through full open access, which is ideal, or distributed by a professional organization without a stake in the research results—so scholars can reproduce or challenge analyses. This also lowers the chances study results will be misused. We are proud that the raw data for nearly all ancient genomes published so far was made publicly available at or before the time of publication.

Finally, we agreed that Indigenous-led data repositories such as those now being developed could help mediate permissions when scholars wish to use data for purposes beyond those articulated in an original study plan.

**HMNews: Given that equity is a priority, how accessible will this paper be to those who, for example, don't have paid access to the journal in which it's being published or who aren't fluent in English?**

Sirak: We've made our paper open access and applied the most flexible



Creative Commons license to it, known as CC BY 4.0. That means it's available for free to anyone in the public to read, distribute, adapt, and build upon. Our team members also have translated the text into more than 20 languages that they speak.

## **HMNews: Do you expect pushback from scientists who feel that the guidelines are too onerous and will make it harder to carry out research?**

Sedig: We did receive feedback during the review process that the guidelines were too strong—that they would create a heavy burden for researchers from smaller labs or who are in the early stages of their careers. We respect this perspective and understand that we're requesting a lot in terms of engaging with stakeholders and what could be called overhead beyond the research itself. However, we firmly believe that all ancient DNA studies, from an early-career stage onwards, should meet these [ethical standards](#).

In a way, the proposals are merely concretizing the standards that are already emerging in the field. We believe that authors and journal editors feel their way toward this ethical framework during the review process. We believe that the proposals are practical and that early-career researchers—including many who co-authored our article—will benefit from having the principles clearly articulated and the guesswork reduced as they aim to carry out their research in an ethically principled way.

## **HMNews: What enforcement would there be if someone involved in ancient DNA research didn't follow these guidelines?**

Sirak: Our co-authors do not represent any official organization, so we

cannot make or enforce rules for anyone except ourselves. What our paper does represent is a grassroots, community-led pledge from representatives of a nontrivial faction of worldwide researchers engaged in this type of work. We have committed to adhering to a set of strong principles, and we invite others to hold us accountable to them.

It would be a great outcome if scientific journals, professional societies, or granting agencies found these proposals useful enough to turn into official guidelines, which would mean there could be professional repercussions for not adhering to them. The fact that scholars from such a diverse array of nations and disciplines have signed on to the guidelines at this stage makes us optimistic that they will be embraced in practice by laboratories and research groups as well as other groups engaged in ancient DNA research all over the world. But either way, it's important to continue the global conversation.

**More information:** David Reich, Ethics of DNA research on human remains: five globally applicable guidelines, *Nature* (2021). [DOI: 10.1038/s41586-021-04008-x](https://doi.org/10.1038/s41586-021-04008-x).

Provided by Harvard Medical School

Citation: Proceeding with Caution: First global guidelines proposed for ancient DNA research (2021, October 20) retrieved 25 April 2024 from <https://phys.org/news/2021-10-proceeding-caution-global-guidelines-ancient.html>

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